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August 14, 2001
BVY 01-64

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: **Vermont Yankee Nuclear Power Station**
License No. DPR-28 (Docket No. 50-271)
Technical Specification Proposed Change No. 249
HPCI and RCIC Allowed Outage Time

Pursuant to 10CFR50.90, Vermont Yankee (VY) hereby proposes to amend its Facility Operating License, DPR-28, by incorporating the attached proposed change into the VY Technical Specifications. This proposed change extends the allowed outage time (AOT) for the High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems from 7 days to 14 days. The extension of AOT provides additional time to perform testing, maintenance, or make repairs without significantly affecting plant safety.

Attachment 1 to this letter contains supporting information and the safety assessment of the proposed change. Attachment 2 contains the determination of no significant hazards consideration. Attachment 3 provides the marked-up version of the current Technical Specification pages. Attachment 4 is the retyped Technical Specification pages.

VY has reviewed the proposed Technical Specification change in accordance with 10CFR50.92 and concludes that the proposed change does not involve a significant hazards consideration.

VY has also determined that the proposed change satisfies the criteria for a categorical exclusion in accordance with 10CFR51.22(c)(9) and does not require an environmental review. Therefore, pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment needs to be prepared for this change.

Upon acceptance of this proposed change by the NRC, VY requests that a license amendment be issued for implementation within 30 days of its effective date.

A001

If you have any questions on this transmittal, please contact Mr. Gautam Sen at (802) 258-4111.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Michael A. Balduzzi
Senior Vice President and Chief Nuclear Officer

STATE OF VERMONT)
)ss
WINDHAM COUNTY)

Then personally appeared before me, Michael A. Balduzzi, who, being duly sworn, did state that he is Senior Vice President and Chief Nuclear Officer of Vermont Yankee Nuclear Power Corporation, that he is duly authorized to execute and file the foregoing document in the name and on the behalf of Vermont Yankee Nuclear Power Corporation, and that the statements therein are true to the best of his knowledge and belief.

Sally A. Sandstrum, Notary Public
My Commission Expires February 10, 2003

Attachments

cc: USNRC Region 1 Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS
Vermont Department of Public Service

Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 249

HPCI and RCIC Allowed Outage Time

Supporting Information and Safety Assessment of Proposed Change

INTRODUCTION

Purpose

This proposed change extends the Technical Specification (TS) allowed outage time (AOT) for the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems from 7 days to 14 days. The extension of AOT provides additional time to perform testing, maintenance, or make repairs without significantly affecting plant safety. This increased flexibility in work scheduling may benefit system reliability because increased AOT will provide additional time for inspection, testing, maintenance and other quality-contributing activities.

Current Technical Specifications

Current TS Limiting Condition for Operation (LCO) 3.5.E.2 provides conditions during reactor power operation that permit the HPCI System to be inoperable for a period not to exceed seven days. Similarly, TS LCO 3.5.G.2 provides conditions during reactor power operation that permit RCIC to be inoperable for a period not to exceed seven days.

Specifically, current TS 3.5.E.2 states:

> *From and after the date that the HPCI Subsystem is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days unless such subsystem is sooner made operable, provided that during such seven days all active components of the Automatic Depressurization Subsystems, the Core Spray Subsystems, the LPCI Subsystems, and the RCIC System are operable.*

And current TS 3.5.G.2 states:

> *From and after the date that the RCIC System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 7 days unless such system is sooner made operable, provided that during such 7 days all active components of the HPCI System are operable.*

Description of Proposed Change

TS 3.5.E.2 is changed to:

> *From and after the date that the HPCI System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 14 days unless such system is sooner made operable, provided that:*
>
> a. *The RCIC System is immediately verified by administrative means to be operable, and*
>
> b. *During such 14 days all active components of the Automatic Depressurization System, the Core Spray Subsystems, the LPCI Subsystems, and the RCIC System are operable.*

TS 3.5.G.2 is changed to:

> *From and after the date that the RCIC System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 14 days unless such system is sooner made operable, provided that:*
>
> *a. The HPCI System is immediately verified by administrative means to be operable, and*
>
> b. *During such 14 days all active components of the HPCI System are operable.*

Conforming changes are also being made to the associated TS Bases to support and explain the reasons for each specification.

In accordance with revised TS 3.5.E.2, if the HPCI System is inoperable and the RCIC System is verified to be operable, the HPCI System must be restored to operable status within 14 days during reactor power operation. In this condition, adequate core cooling is ensured by the operability of the redundant and diverse low pressure emergency core cooling system (ECCS) injection and spray subsystems in conjunction with the Automatic Depressurization System (ADS). Also, the RCIC System will automatically provide makeup water at reactor operating pressures above 150 psig (the same required operability setpoint as HPCI). Immediate verification of RCIC operability is therefore required when HPCI is inoperable. This may be performed as an administrative check by examining logs or other information to determine if RCIC is out of service for maintenance or other reasons. It does not mean it is necessary to perform the surveillances needed to demonstrate the operability of the RCIC System. If operability of the RCIC System cannot be verified, however, TS 3.5.E.3 requires that an orderly shutdown be initiated and the reactor pressure reduced to $\leq$ 150 psig within 24 hours.

In accordance with revised TS 3.5.G.2, if the RCIC System is inoperable and the HPCI System is verified to be operable, the RCIC System must be restored to operable status within 14 days during reactor power operation. In this condition, loss of the RCIC System will not affect the overall plant capability to provide makeup inventory at high reactor pressure since the HPCI System is the only high pressure system assumed to function during a loss of coolant accident. Operability of HPCI is therefore verified immediately when the RCIC System is inoperable during reactor power operation. This may be performed as an administrative check, by examining logs or other information, to determine if HPCI is out of service for maintenance or other reasons. It does not mean it is necessary to perform surveillances needed to demonstrate the operability of the HPCI System. If the operability of the HPCI System cannot be verified, however, TS 3.5.G.3 requires that an orderly shutdown be initiated and the reactor pressure reduced to $\leq$ 150 psig within 24 hours. For transients and certain abnormal events with no LOCA, RCIC (as opposed to HPCI) is the preferred source of makeup coolant because of its relatively small capacity, which allows easier control of the reactor water level. Therefore, a limited time (14 days) is allowed to restore the inoperable RCIC System to operable status.

In current TS 3.5.E.2, HPCI and ADS are referred to as "subsystems." This is being changed in the revised TS 3.5.E.2 to "system" since HPCI and ADS are both single train systems and do not have redundant or duplicate subsystems within the systems. This change in terminology is an administrative change to the TS and is acceptable since it does not change any technical requirement.

BACKGROUND

HPCI and RCIC Reliability/Availability

The following represent current HPCI and RCIC reliability and availability data (through June 2001) relative to established industry standards for performance monitoring:

HPCI

- Unavailability - (Based upon 3 year rolling window)
  SSC Baseline Unavailability Criterion = 1.68, Actual = 1.03
- Reliability (MRFF's) (Based on 3 year rolling window)
  Criterion = 3, Actual = 2 (however, no functional failures on start demand)
- NRC Performance Indicator Color = Green, for all Mitigating Systems

RCIC

- Unavailability - (Based upon 3 year rolling window)
  SSC Baseline Unavailability Criterion = 1.68, Actual = 0.68
- Reliability (MRFF's) (Based on 3 year rolling window)
  Criterion = 3, Actual = 2 (however, no functional failures on start demand)
- NRC Performance Indicator Color = Green, for all Mitigating System

HPCI Design Basis

The HPCI System consists of a steam driven turbine pump unit, piping, and valves to provide steam to the turbine, as well as piping and valves to transfer water from the condensate storage tank (or suppression pool) to the core via the feedwater system line, where the coolant is distributed within the reactor through the feedwater sparger. The HPCI System is designed to provide core cooling for a wide range of reactor pressures.

For a small break, the HPCI System will maintain coolant inventory as well as vessel level while the reactor is pressurized. The HPCI System permits the reactor to be shut down while maintaining sufficient reactor vessel water inventory until the reactor vessel is depressurized. The HPCI System continues to operate until reactor pressure is below the pressure at which LPCI or core spray is available. If HPCI fails or is unavailable, it is backed up by ADS in combination with LPCI and core spray.

For additional information on the HPCI System, see UFSAR Sections 6.4.1 and 6.5.2.2. For HPCI controls and instrumentation, see UFSAR Section 7.4.

RCIC Design Basis

The RCIC System is not part of the ECCS; however, the RCIC System has design similarities to HPCI and provides makeup coolant in a similar manner as HPCI. The RCIC System is designed to operate either automatically or manually following reactor isolation accompanied by a loss of coolant flow from the feedwater system to provide adequate core cooling and control of reactor water level. Under these conditions, either HPCI or RCIC is capable of providing makeup inventory.

Although not classified as a safety system, RCIC performs a similar function as HPCI, but has reduced makeup capability. The Reactor Core Isolation Cooling (RCIC) system provides makeup water to the reactor vessel during shutdown and isolation to supplement or replace the normal makeup sources (see UFSAR Section 4.7). No credit is taken in the current VY licensing basis LOCA analyses for RCIC system operation. The RCIC system is not an engineered safety feature; however, the contribution of RCIC in mitigating certain postulated transients can be substantial. For example, RCIC flow is assumed for most isolation events, such as loss of feedwater and loss of auxiliary power transients. RCIC operation is also credited during station blackout and following certain 10CFR50, Appendix R fire events.

Upon receipt of a low-low reactor vessel water level signal, RCIC automatically starts and is capable of providing its design flow rate within a specified initiation time and over a wide range of reactor vessel pressures. When a reactor vessel high water level signal is received, RCIC stops automatically. Like HPCI, the RCIC system is designed to perform its function without reliance on station auxiliary power, other than a DC power supply. RCIC can be used to augment HPCI during small or intermediate-break LOCAs. RCIC is a single train system; therefore, it is not designed to meet single failure criteria, except for its initiation circuitry. Since HPCI is the only safety-related system capable of maintaining coolant inventory under high reactor pressure, it may be considered the backup to RCIC (if available).

Comparison to Standard Technical Specifications

Standard Technical Specifications[1] contain LCO requirements for HPCI and RCIC operation. LCO 3.5.1, Condition C provides a 14-day AOT for HPCI, and LCO 3.5.3, Condition A provides a 14-day AOT for RCIC. The Basis for the 14 days is an NRC-sponsored reliability study (Reference 2). Boiling Water Reactor plants converting to improved Standard Technical Specifications typically reference this reliability study as the basis for the 14-day AOT.

SAFETY ASSESSMENT

The extension of AOTs from 7 to 14 days provides additional time to perform testing or to make repairs without significantly affecting overall plant safety. The justifications for this extension are based on traditional deterministic engineering considerations supported with risk insights provided by probabilistic risk assessments.

AOT requirements that limit the duration that a system may be out of service for any given occasion were originally included in TS based on engineering judgment because there was a lack of plant operating history and equipment failure data. These AOTs, like surveillance test intervals, were somewhat arbitrary, but generally related to defined calendar periods (e.g., day, week, month). Plant operating history and reliability studies now show that AOTs can be more precisely based on operating experience and risk assessments.

The VY HPCI and RCIC systems have demonstrated a high degree of reliability that justifies the extended AOT. The 14 day allowed outage time for HPCI and RCIC is based on a reliability study[2] that evaluated the impact of ECCS availability, assuming various components and subsystems were taken out

[1] NUREG-1433, Revision 1, "Standard Technical Specifications, General Electric Plants, BWR/4," dated April 1995

[2] Memorandum from R.L. Baer (NRC) to V. Stello, Jr. (NRC), "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

of service. The results were used to calculate the average availability of ECCS equipment needed to mitigate the consequences of a LOCA as a function of AOTs. Because of similar functions of HPCI and RCIC, the allowed outage times (i.e., completion times) determined for HPCI are also applied to RCIC. This is justified because the systems are similar in design and operating conditions and have comparable failure histories. During the period when HPCI is unavailable, adequate core cooling is ensured by the operability of the redundant and diverse low pressure ECCS injection/spray subsystems in conjunction with ADS. In addition, the RCIC System will automatically provide makeup water at the samereactor pressures as HPCI.

Reference (2) presented the average BWR unreliability of ECCS equipment as a function of increased outage time. As can be seen from those results, average reliability increases only moderately as outage time increases.

The 14 day completion time for restoring HPCI or RCIC is contingent upon the operability of redundant systems. In the case of HPCI, RCIC and all of the remaining ECCS (ADS, LPCI, and core spray) are required to be operable. In the case of RCIC, HPCI is required to be operable. For HPCI, the VY TS requirement is more restrictive than the STS requirement that allows one low pressure ECCS injection/spray subsystem to be inoperable for 72 hours with HPCI inoperable.

System Redundancy

As single train systems, neither HPCI nor RCIC is internally redundant. Redundancy for HPCI is provided by ADS, and redundancy for RCIC is provided by HPCI. Because of the complete redundancy and high degree of diversity provided, a deterministic evaluation with respect to availability of safety function shows that safety function is maintained if no single failure is assumed during the AOT interval. For accident scenarios crediting HPCI, ADS in conjunction with either LPCI or core spray provides a backup function to HPCI and is adequate to satisfy the high pressure ECCS safety function. No single failure will disable both the ADS and HPCI System. If HPCI were unavailable, the redundancy of the ADS provides adequate protection for all possible break situations. RCIC can also be used to augment or backup the HPCI System (up to the limits of its flow rate—400 gpm) during small- or intermediate-break LOCAs.

The HPCI System is capable of fulfilling the design objectives of RCIC in the event that RCIC is not available following loss of feedwater, loss of auxiliary power transients. HPCI is also credited with providing water for core cooling and reactor vessel makeup during station blackout and following certain Appendix R fires.

Risk Information

Although VY has taken a traditional approach in assessing the safety aspects of this change, because of the availability of the VY probabilistic risk model, VY has performed site-specific probabilistic safety assessment (PSA) calculations that support the increased AOT duration from 7 days to 14 days. The PSA model used included transient and internal event initiators and did not include external events and fire. This assessment goes beyond the traditional licensing basis analyses, and is presented here as supplemental risk insights to support the deterministic evaluation. The PSA evaluation determined that the conditional core damage probability for a 14-day AOT for the HPCI and RCIC Systems is less than the threshold value of 1E-06[3].

[3] EPRI TR-105396, "PSA Applications Guide," August 1995

Risk Perspective of 14 Day AOT for RCIC and HPCI

The proposed 14 day AOT for RCIC and HPCI was assessed from a risk perspective using the VY plant specific probabilistic safety assessment (PSA). Based on the assessment performed, the Incremental Core Damage Probability (ICDP) for a 14 day unavailability duration is very small and within industry guidance. Therefore, the proposed 14 day AOT is judged not risk significant.

The PSA-modeled functions of RCIC and HPCI are to inject sufficient makeup water to the reactor vessel to maintain adequate inventory for core cooling. The RCIC and HPCI functions are credited in transient-type initiating events and LOCA-type initiating events as presented in Table 1.

Table 1

PSA Initiating Event	RCIC/HPCI Credited
Transient Events	
Turbine trip with feedwater and condenser available	RCIC & HPCI
Turbine trip with MSIV closure and feedwater available	RCIC & HPCI
Turbine trip with MSIV closure and loss of feedwater	RCIC & HPCI
Loss of offsite power transient (SBO)	RCIC & HPCI
Special initiators including loss of AC bus, DC bus, loss of Service Water	RCIC & HPCI
Internal Flooding Initiators	RCIC & HPCI
LOCA Events	
Medium Break LOCA (includes inadvertent opening of a relief valve)	HPCI
Small Break LOCA	RCIC & HPCI
Small Break Interfacing Systems LOCA	HPCI

Risk assessments of the proposed HPCI and RCIC 14 day AOTs were performed by modifying and re-quantifying the PSA model. The model was modified to change the HPCI (and RCIC) system failure rate from its nominal value to guaranteed failure (failure rate = 1.0). Consistent with VY PSA assumptions, it is assumed that HPCI (and RCIC) is non-recoverable (if needed). This is conservative because many of the maintenance tasks typically performed are not significantly intrusive and can be quickly restored. In fact, Vermont Yankee LCO plans are typically written to maximize the restoration potential of the system. All other modeled SSC failure rates and initiating event frequencies are assumed to remain at their PSA nominal values. The revised PSA model was re-quantified to determine the change in CDF given HPCI (or RCIC) is out-of-service. The results of the re-quantification support the conclusion that 14-day AOT for HPCI or RCIC is not risk significant.

Conclusion/Summary

The proposed 14 day AOT for RCIC and HPCI is consistent with the industry standard AOT for HPCI and RCIC and is based on an NRC ECCS reliability study. VY's HPCI and RCIC Systems are similar to those of other domestic boiling water reactors and performance indicators illustrate acceptable availability and reliability.

VY has further evaluated this proposed change based on risk insights using techniques beyond the current licensing basis. Those techniques (PSA) further demonstrate that the ICDP for a 14 day unavailability window is very small and within industry guidance. Therefore, the proposed 14 day AOT

is judged not risk significant for VY and may even benefit system reliability because increased AOT will provide additional time for inspection, testing, maintenance and other quality-contributing activities.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; (2) such activities will be conducted in compliance with the Commission's regulations; and (3) the issuance of the requested license amendment will not be inimical to the common defense and security or to the health and safety of the public.

Attachment 2

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 249

HPCI and RCIC Allowed Outage Time

Determination of No Significant Hazards Consideration

Description of amendment request:

The proposed amendment would extend the Technical Specification allowed outage time (AOT) for the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems from 7 days to 14 days. The extension of AOT provides additional time to perform testing, maintenance, or make repairs without significantly affecting plant safety. This increased flexibility in work scheduling may benefit system reliability because increased AOT will provide additional time for inspection, testing, maintenance and other quality-contributing activities.

Basis for No Significant Hazards Determination:

Pursuant to 10CFR50.92, VY has reviewed the proposed change and concludes that the change does not involve a significant hazards consideration since the proposed change satisfies the criteria in 10CFR50.92(c). These criteria require that the operation of the facility in accordance with the proposed amendment will not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. The discussion below addresses each of these criteria and demonstrates that the proposed amendment does not constitute a significant hazard.

1. Will the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

   The High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems do not serve any function for preventing accidents, and their unavailability would not affect the probability of accidents previously evaluated. The unavailability of either HPCI or RCIC is not considered to be a potential accident initiator. As such, the inoperability of HPCI or RCIC will not increase the probability of any accident previously evaluated.

   Therefore, the proposed change will not increase the probability of any accident previously evaluated.

   Emergency Core Cooling Systems (ECCS) are used to mitigate the consequences of an accident. However, RCIC is not an ECCS and is not credited in any accident previously evaluated. HPCI is capable of mitigating small loss of coolant accidents, but this function would be met by the available Automatic Depressurization System in conjunction with the low pressure coolant injection or core spray systems, which is the basis for the current 7-day allowed outage time (AOT). The consequences of an event occurring during the proposed 14-day AOT are the same as the consequences of an event occurring during the existing 7-day AOT. Therefore, adequate core cooling would still be provided and the consequences of accidents previously evaluated are not increased.

   Therefore, the proposed change will not increase the consequences of any accident previously evaluated.

2. Will the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

This proposed change to the Technical Specifications will not physically alter the plant. No new or different types of equipment will be installed. Plant operations will remain consistent with current safety analysis assumptions regarding availability of equipment. Thus, no new failure mode not previously analyzed will be introduced.

Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Will the proposed changes involve a significant reduction in a margin of safety?

The proposed change does not involve a significant decrease in a margin of safety because, as in the existing AOT Technical Specifications, the 14-day completion time for restoring HPCI or RCIC is contingent upon the operability of redundant equipment (i.e., for HPCI, RCIC and ADS in conjunction with low pressure coolant injection/spray subsystems are required to be operable; and for RCIC, HPCI is required to be operable).

The 14-day completion time is based on a reliability study that evaluated the impact on ECCS availability (Memorandum from R.L. Baer (NRC) to V. Stello, Jr. (NRC), "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975). This study determined that allowing the additional outage time for HPCI was acceptable and demonstrated that adequate core cooling would still be provided. The same justification applies to RCIC.

Therefore, this change does not involve a significant reduction in a margin of safety.

Conclusion

On the basis of the above, VY has determined that operation of the facility in accordance with the proposed change does not involve a significant hazards consideration as defined in 10CFR50.92(c), in that it: (1) does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) does not involve a significant reduction in a margin of safety.

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Attachment 3

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 249

HPCI and RCIC Allowed Outage Time

Marked-up Version of the Current Technical Specifications

3.5 LIMITING CONDITION FOR OPERATION

2. From and after the date that the HPCI ~~Subsystem~~ System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding ~~seven~~ 14 days unless such ~~sub~~system is sooner made operable, provided that: ~~during such seven days all active components of the Automatic Depressurization Subsystems, the Core Spray Subsystems, the LPCI Subsystems, and the RCIC System are operable.~~

3. If the requirements of either Specification 3.5.E or Specification 4.5.E.1.c cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to ≤ 150 psig within 24 hours.

F. Automatic Depressurization System

1. Except as specified Specification 3.5.F below, the entire Automatic Depressurization Re System shall be ope at any time the rea steam pressure is al 150 psig and irradia fuel is in the reactoı vessel.

2. From and after the date that one of the four relief valves of the Automatic Depressurization Subsystem are made or found to be inoperable due to malfunction of the electrical portion of the valve when the

4.5 SURVEILLANCE REQUIREMENT

d. The HPCI System shall deliver at least 4250 gpm at normal reactor operating pressure when recirculating to the Condensate Storage Tank.

2. When the HPCI Subsystem is made or found to be inoperable, the Automatic Depressurization System shall have been or shall be demonstrated to be operable within 24 hours.

NOTE: Automatic Depressurization System operability shall be demonstrated by performing a functional test of the trip system logic.

a. The RCIC System is immediately verified by administrative means to be operable, and

b. During such 14 days all active components of the Automatic Depressurization System, the Core Spray Subsystems, the LPCI Subsystems, and the RCIC System are operable.

. the HPCI Subsystem shall have been or shall be demonstrated to be operable within 24 hours.

3.5 LIMITING CONDITION FOR OPERATION

reactor is pressurized above 150 psig with irradiated fuel in the reactor vessel, continued reactor operation is permissible only during the succeeding seven days unless such a valve is sooner made operable, provided that during seven days both the remaining Automati Relief System val the HPCI System a operable.

3. If the requirement Specification 3.5.. cannot be met, an o shutdown shall be initiated and the reac pressure shall be reduce to ≤ 150 psig within 24 hours.

G. Reactor Core Isolation Cooling System (RCIC)

1. Except as specified in Specification 3.5.G.2 below, the RCIC System shall be operable whenever the reactor steam pressure is greater than 150 psig and irradiated fuel is in the reactor vessel.

2. From and after the date that the RCIC System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 14 ~~7~~ days unless such system is sooner made operable, provided that: ~~during such 7 days all active components of the HPCI System are operable.~~

4.5 SURVEILLANCE REQUIREMENT

a. The HPCI System is immediately verified by administrative means to be operable, and

b. During such 14 days all active components of the HPCI System are operable.

G. Reactor Core Isolation Cooling System (RCIC)

Surveillance of the RCIC System shall be performed as follows:

1. Testing

a. A simulated automatic actuation test (testing valve operability) of the RCIC System shall be performed during each refueling outage.

b. Operability testing of the pump and valves shall be in accordance with Specification 4.6.E.

c. Upon reactor startup, RCIC operability testing shall be performed as required by Specification 4.6.E within 24 hours after exceeding 150 psig reactor steam pressure.

SSW pump, SSW valve, etc.), then reactor operation is limited to 15 days provided that during this time both the normal and emergency power supplies for the remaining operable equipment are also operable, in addition to demonstrating the operability of all remaining active components of the SSW system which perform a safety function and the alternate cooling tower fan.

If the SSW System would not be capable of performing its safety function for any reason, even without assuming a worst case single active failure, then the reactor must be placed in the cold shutdown condition within 24 hours.

E. High Pressure Coolant Injection System

The High Pressure Coolant Injection System (HPCIs) is provided to adequately cool the core for all pipe breaks smaller than those for which the LPCI or Core Spray Cooling Subsystems can protect the core.

The HPCIs meets this requirement without the use of outside power. For the pipe breaks for which the HPCIs is intended to function the core never uncovers and is continuously cooled; thus, no clad damage occurs and clad temperatures remain near normal throughout the transient. Reference: Subsection 6.5.2.2 of the FSAR.

INSERT #1

F. Automatic Depressurization System

The Automatic Depressurization System (ADS) consists of the four safety-relief valves and serves as a backup to the High Pressure Coolant Injection System (HPCI). ADS is designed to provide depressurization of the reactor coolant system during a small break loss-of-coolant accident if HPCI fails or is unable to maintain sufficient reactor water level. Since HPCI operability is required above 150 psig, ADS operability is also required above this pressure.

ADS operation reduces the reactor pressure to within the operating pressure range of the low pressure coolant injection and core spray systems, so that these systems can provide reactor coolant inventory makeup.

G. Reactor Core Isolation Cooling System

The Reactor Core Isolation Cooling System (RCIC) is provided to maintain the water inventory of the reactor vessel in the event of a main steam line isolation and complete loss of outside power without the use of the emergency core cooling systems. The RCIC meets this requirement. Reference Section 14.5.4.4 FSAR. The HPCIS provides an incidental backup to the RCIC system such that in the event the RCIC should be inoperable no loss of function would occur if the HPCIS is operable.

INSERT #2

H. Minimum Core and Containment Cooling System Availability

The core cooling and containment cooling subsystems provide a method of transferring the residual heat following a shutdown or accident to a heat sink. Based on analyses, this specification assures that the core and containment cooling function is maintained with any combination of allowed inoperable components.

INSERT #1

In accordance with Specification 3.5.E.2, if the HPCI System is inoperable and the RCIC System is verified to be operable, the HPCI System must be restored to operable status within 14 days during reactor power operation. In this condition, adequate core cooling is ensured by the operability of the redundant and diverse low pressure emergency core cooling system (ECCS) injection and spray subsystems in conjunction with the Automatic Depressurization System (ADS). Also, the RCIC System will automatically provide makeup water at reactor operating pressures above 150 psig. During reactor power operation, immediate verification of RCIC operability is therefore required when HPCI is inoperable. This may be performed as an administrative check by examining logs or other information to determine if RCIC is out of service for maintenance or other reasons. It does not mean it is necessary to perform the surveillances needed to demonstrate the operability of the RCIC System. If operability of the RCIC System cannot be verified, however, Specification 3.5.E.3 requires that an orderly shutdown be initiated and reactor pressure reduced to $\leq$ 150 psig within 24 hours.

INSERT #2

In accordance with Specification 3.5.G.2, if the RCIC System is inoperable and the HPCI System is verified to be operable, the RCIC System must be restored to operable status within 14 days during reactor power operation. In this condition, loss of the RCIC System will not affect the overall plant capability to provide makeup inventory at high reactor pressure since the HPCI System is the only high pressure system assumed to function during a loss of coolant accident. Operability of HPCI is therefore verified immediately when the RCIC System is inoperable during reactor power operation. This may be performed as an administrative check, by examining logs or other information, to determine if HPCI is out of service for maintenance or other reasons. It does not mean it is necessary to perform surveillances needed to demonstrate the operability of the HPCI System. If the operability of the HPCI System cannot be verified, however, Specification 3.5.G.3 requires that an orderly shutdown be initiated and reactor pressure reduced to $\leq$ 150 psig within 24 hours. For transients and certain abnormal events with no LOCA, RCIC (as opposed to HPCI) is the preferred source of makeup coolant because of its relatively small capacity, which allows easier control of the reactor water level. Therefore, a limited time (14 days) is allowed to restore the inoperable RCIC System to operable status.

Attachment 4

Vermont Yankee Nuclear Power Station

Proposed Technical Specification Change No. 249

HPCI and RCIC Allowed Outage Time

Retyped Technical Specification Pages

Listing of Affected Technical Specifications Pages

Replace the Vermont Yankee Nuclear Power Station Technical Specifications page(s) listed below with the revised page(s) included herein. The revised page(s) contain(s) vertical lines in the margin indicating the areas of change.

Remove	Insert
106	106
107	107
108	108
111a	111a
-	111b
112	112

3.5 LIMITING CONDITION FOR OPERATION

2. From and after the date that the HPCI System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 14 days unless such system is sooner made operable, provided that:

   a. The RCIC System is immediately verified by administrative means to be operable, and

   b. During such 14 days all active components of the Automatic Depressurization System, the Core Spray Subsystems, the LPCI Subsystems, and the RCIC System are operable.

3. If the requirements of either Specification 3.5.E or Specification 4.5.E.1.c cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to ≤ 150 psig within 24 hours.

F. Automatic Depressurization System

1. Except as specified in Specification 3.5.F.2 below, the entire Automatic Depressurization Relief System shall be operable at any time the reactor steam pressure is above 150 psig and irradiated fuel is in the reactor vessel.

2. From and after the date that one of the four relief valves of the Automatic Depressurization Subsystem are made or found to be inoperable

4.5 SURVEILLANCE REQUIREMENT

   d. The HPCI System shall deliver at least 4250 gpm at normal reactor operating pressure when recirculating to the Condensate Storage Tank.

2. When the HPCI Subsystem is made or found to be inoperable, the Automatic Depressurization System shall have been or shall be demonstrated to be operable within 24 hours.

   NOTE: Automatic Depressurization System operability shall be demonstrated by performing a functional test of the trip system logic.

F. Automatic Depressurization System

Surveillance of the Automatic Depressurization System shall be performed as follows:

1. Operability testing of the relief valves shall be in accordance with Specification 4.6.E.

2. When one relief valve of the Automatic Pressure Relief Subsystem is made or found to be inoperable, the HPCI Subsystem shall have been or shall be demonstrated to be operable within 24 hours.

3.5 LIMITING CONDITION FOR OPERATION

due to malfunction of the electrical portion of the valve when the reactor is pressurized above 150 psig with irradiated fuel in the reactor vessel, continued reactor operation is permissible only during the succeeding seven days unless such a valve is sooner made operable, provided that during such seven days both the remaining Automatic Relief System valves and the HPCI System are operable.

3. If the requirements of Specification 3.5.F cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to ≤ 150 psig within 24 hours.

G. Reactor Core Isolation Cooling System (RCIC)

1. Except as specified in Specification 3.5.G.2 below, the RCIC System shall be operable whenever the reactor steam pressure is greater than 150 psig and irradiated fuel is in the reactor vessel.

2. From and after the date that the RCIC System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 14 days unless such system is sooner made operable, provided that:

   a. The HPCI System is immediately verified by administrative means to be operable, and

4.5 SURVEILLANCE REQUIREMENT

G. Reactor Core Isolation Cooling System (RCIC)

Surveillance of the RCIC System shall be performed as follows:

1. Testing

   a. A simulated automatic actuation test (testing valve operability) of the RCIC System shall be performed during each refueling outage.

   b. Operability testing of the pump and valves shall be in accordance with Specification 4.6.E.

   c. Upon reactor startup, RCIC operability testing shall be performed as required by Specification 4.6.E within 24 hours after exceeding 150 psig reactor steam pressure.

3.5 LIMITING CONDITION FOR OPERATION

b. During such 14 days all active components of the HPCI System are operable.

3. If the requirements of either Specification 3.5.G or Specification 4.5.G.1.c cannot be met, an orderly shutdown shall be initiated and the reactor pressure shall be reduced to ≤ 150 psig within 24 hours.

H. Minimum Core and Containment Cooling System Availability

1. During any period when one of the emergency diesel generators is inoperable, continued reactor operation is permissible only during the succeeding seven days, provided that all of the LPCI, Core Spray and Containment Cooling Subsystems connecting to the operable diesel generator shall be operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

2. Any combination of inoperable components in the Core and Containment Cooling Systems shall not defeat the capability of the remaining operable components to fulfill the core and containment cooling functions.

3. When irradiated fuel is in the reactor vessel and the reactor is in either a refueling or cold shutdown condition, all Core and Containment Cooling Subsystems may be

4.5 SURVEILLANCE REQUIREMENT

d. The RCIC System shall deliver at least 400 gpm at normal reactor operating pressure when recirculating to the Condensate Storage Tank.

H. Minimum Core and Containment Cooling System Availability

1. When one of the emergency diesel generators is made or found to be inoperable, the remaining diesel generator shall have been or shall be demonstrated to be operable within 24 hours.

SSW pump, SSW valve, etc.), then reactor operation is limited to 15 days provided that during this time both the normal and emergency power supplies for the remaining operable equipment are also operable, in addition to demonstrating the operability of all remaining active components of the SSW system which perform a safety function and the alternate cooling tower fan.

If the SSW System would not be capable of performing its safety function for any reason, even without assuming a worst case single active failure, then the reactor must be placed in the cold shutdown condition within 24 hours.

E. High Pressure Coolant Injection System

The High Pressure Coolant Injection System (HPCIs) is provided to adequately cool the core for all pipe breaks smaller than those for which the LPCI or Core Spray Cooling Subsystems can protect the core.

The HPCIs meets this requirement without the use of outside power. For the pipe breaks for which the HPCIs is intended to function the core never uncovers and is continuously cooled; thus, no clad damage occurs and clad temperatures remain near normal throughout the transient. Reference: Subsection 6.5.2.2 of the FSAR.

In accordance with Specification 3.5.E.2, if the HPCI System is inoperable and the RCIC System is verified to be operable, the HPCI System must be restored to operable status within 14 days during reactor power operation. In this condition, adequate core cooling is ensured by the operability of the redundant and diverse low pressure emergency core cooling system (ECCS) injection and spray subsystems in conjunction with the Automatic Depressurization System (ADS). Also, the RCIC System will automatically provide makeup water at reactor operating pressures above 150 psig. During reactor power operation, immediate verification of RCIC operability is therefore required when HPCI is inoperable. This may be performed as an administrative check by examining logs or other information to determine if RCIC is out of service for maintenance or other reasons. It does not mean it is necessary to perform the surveillances needed to demonstrate the operability of the RCIC System. If operability of the RCIC System cannot be verified, however, Specification 3.5.E.3 requires that an orderly shutdown be initiated and reactor pressure reduced to ≤ 150 psig within 24 hours.

F. Automatic Depressurization System

The Automatic Depressurization System (ADS) consists of the four safety-relief valves and serves as a backup to the High Pressure Coolant Injection System (HPCI). ADS is designed to provide depressurization of the reactor coolant system during a small break loss-of-coolant accident if HPCI fails or is unable to maintain sufficient reactor water level. Since HPCI operability is required above 150 psig, ADS operability is also required above this pressure.

ADS operation reduces the reactor pressure to within the operating pressure range of the low pressure coolant injection and core spray systems, so that these systems can provide reactor coolant inventory makeup.

G. Reactor Core Isolation Cooling System

The Reactor Core Isolation Cooling System (RCIC) is provided to maintain the water inventory of the reactor vessel in the event of a main steam line isolation and complete loss of outside power without the use of the emergency core cooling systems. The RCIC meets this requirement. Reference Section 14.5.4.4 FSAR. The HPCIS provides an incidental backup to the RCIC system such that in the event the RCIC should be inoperable no loss of function would occur if the HPCIS is operable.

In accordance with specification 3.5.G.2, if the RCIC System is inoperable and the HPCI System is verified to be operable, the RCIC System must be restored to operable status within 14 days during reactor power operation. In this condition, loss of the RCIC System will not affect the overall plant capability to provide makeup inventory at high reactor pressure since the HPCI System is the only high pressure system assumed to function during a loss of coolant accident. Operability of HPCI is therefore verified immediately when the RCIC System is inoperable during rector power operation. This may be performed as an administrative check, by examining logs or other information, to determine if HPCI is out of service for maintenance or other reasons. It does not mean it is necessary to perform surveillances needed to demonstrate the operability of the HPCI System. If the operability of the HPCI System cannot be verified, however, Specification 3.5.G.3 requires that an orderly shutdown be initiated and reactor pressure reduced to ≤ 150 psig within 24 hours. For transients and certain abnormal events with no LOCA, RCIC (as opposed to HPCI) is the preferred source of makeup coolant because of its relatively small capacity, which allows easier control of the reactor water level. therefore, a limited time (14 days) is allowed to restore the inoperable RCIC System to operable status.

H. Minimum Core and Containment Cooling System Availability

The core cooling and containment cooling subsystems provide a method of transferring the residual heat following a shutdown or accident to a heat sink. Based on analyses, this specification assures that the core and containment cooling function is maintained with any combination of allowed inoperable components.

Operability of low pressure ECCS injection/spray subsystems is required during cold shutdown and refueling conditions to ensure adequate coolant inventory and sufficient heat removal capability for the irradiated fuel in the core in case of inadvertent draindown of the vessel. It is permissible, based upon the low heat load and other methods available to remove the residual heat, to disable all core and containment cooling systems for maintenance if the reactor is in cold shutdown or refueling and there are no operations with a potential for draining the reactor vessel (OPDRV). However, if OPDRVs are in progress with irradiated fuel in the reactor vessel, operability of low pressure ECCS injection/spray subsystems is required to ensure capability to maintain adequate reactor vessel water level in the event of an inadvertent vessel draindown. In this condition, at least 300,000 gallons of makeup water must be available to assure core flooding capability. In addition, only one diesel generator associated with one of the ECCS injection/spray subsystems is required to be operable in this condition since, upon loss of normal power supply, one ECCS subsystem is sufficient to meet this function.

BASES: 3.5 (Cont'd)

The low pressure ECCS injection/spray subsystems consist of two core spray (CS) and two low pressure coolant injection (LPCI) subsystems. During cold shutdown and refueling conditions, each CS subsystem requires one motor driven pump, piping, and valves to transfer water from the suppression pool or condensate storage tank to the reactor pressure vessel (RPV). Also, during cold shutdown and refueling conditions, each LPCI subsystem requires one motor driven pump, piping, and valves to transfer water from the suppression pool to the RPV. Under these conditions, only a single LPCI pump is required per subsystem because of the larger injection capacity in relation to a CS subsystem. One LPCI subsystem may be aligned for decay heat removal and considered operable for the ECCS function, if it can be manually realigned (remote or local) to the LPCI mode and is not otherwise inoperable. Because of low pressure and low temperature conditions during cold shutdown and refueling, sufficient time will be available to manually align and initiate LPCI subsystem operation to provide core cooling prior to postulated fuel uncovery.

I. Maintenance of Filled Discharge Pipe

Full discharge lines are required when the core spray subsystems, LPCI subsystems, HPCI and RCIC are required to be operable to preclude the possibility of damage to the discharge piping due to water hammer action upon a pump start.